Space Weather Forecast

Issued on Wednesday, 15 May 2024 at 13:18 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Strong flares day 1 (15 May), but soon declining. Ongoing S1 Minor Solar Radiation Storm. Slight chance G1 Minor Storm day 1-2 (15-16 May).

Analysis of Space Weather Activity over past 24 hours
Solar Activity: High with three Strong flares observed from the large and complex sunspot now over the southwest limb. This included the largest flare (X8.7) of the solar cycle so far. There remains the potential for further strong flares to be visible despite its far-side location. There are twelve sunspot regions on the visible disc, however they are all currently relatively small and simple. Of the visible regions a small region in the northeast was the most active with a long duration Moderate flare.

Coronal mass ejections (CME) were observed from the flares mentioned, however these were not Earth-directed.

Solar Wind / Geomagnetic Activity: The tail-end of the recent CME enhanced solar wind continued, with elevated speeds of around 550 km/s observed initially, before dropping slightly to around 510km/s. Total Interplanetary Magnetic Field (IMF), was Weak throughout. The north-south component was generally weak and positive (northward). Geomagnetic activity was Quiet to Unsettled (Kp1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is currently at S1/Minor Radiation storm due to the flare activity from the large complex sunspot (now over the southwest limb) during the last couple of days.

Four-Day Space Weather Forecast Summary
Solar Activity: Moderate to High activity is likely to continue day 1 (15 May) with the potential for further flaring to be visible from the sunspot just over the southwest limb, before it moves further away onto the far-side. Activity then declining to Low with a chance of increasing to Moderate with isolated M-flares from the smaller and currently simpler regions present on the visible disc.

Solar Wind / Geomagnetic Activity: There are two CMEs that are currently expected to largely miss Earth, but have some potential for glancing interactions. The first is from the long duration M6.6 flare of AR3664 on 13 May, perhaps glancing later day 1 or early day 2 (15-16 May). The second from the filament eruption on the north-east disc on 14 May, perhaps arriving late day 3 or early day 4 (17-18 May). Both of these are low confidence. Otherwise, no other sources of enhancement are expected with current elevated solar winds expected to gradually ease. Mainly Quiet activity is expected with Unsettled intervals, but with the potential for Unsettled to Active spells with a chance of G1 Minor Storm intervals from any CME glances.

Energetic Particles / Solar Radiation: The count rate of energetic particles is likely to continue above the S1 Minor Radiation storm threshold, but with a declining trend and falling below this

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level day 2 (16 May). However further increases are also possible given the occurrence of any significant flares from the large and complex sunspot region as it continues to rotate beyond the west limb.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	20	5	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	50	40	40
Very Active	R3 to R5 X	Yes	40	15	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	100	60	30	10
Very Active	≥ S3 *	No	5	5	5	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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